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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/754,800	01/04/2001	Seiji Kobayashi	204686US6	3276

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ALEXANDRIA, VA 22314

EXAMINER

CHU, KIM KWOK

ART UNIT	PAPER NUMBER
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2653

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/754,800

Applicant(s)

KOBAYASHI, SEIJI

Examiner

Kim-Kwok CHU

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-26 is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7,10,12 and 15 is/are rejected.
- 7) ☒ Claim(s) 2,3,6,8,9,11,13 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

### ***Specification***

1. The disclosure is objected to because of the following informalities:

(a) in the specification, on page 18, lines 7 and 8, the term "in multi-value recording" should be changed to -- conventional multi-value recording--.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to because Figures 14A and 14B are not designated by a legend such as "Prior Art". The legend is necessary in order to clarify what applicant's invention is.

See MPEP ' 608.02(g). Correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

4. Claims 1, 4, 5, 7, 10, 12 and 15 are rejected under 35

U.S.C. 103(a) as being unpatentable over Hayashi (U.S. Patent 6,327,235) in view of Moses et al. (U.S. Patent 5,612,943).

Hayashi teaches a recording/reproducing apparatus very similar to that of the present invention. For example, Hayashi teaches the following:

(a) as in claim 1, an information recording medium 11 on which data of three or more values are recorded (Figs. 2 and 3, column 5, lines 45-52);

(b) as in claim 1, the data being recorded as a displacement of one of a groove, a groove wall, a mark and a mark wall in response to a modulation signal (Fig. 2);

(c) as in claim 1, a modulation signal being produced from a band-limited signal (Fig. 2; y is a band-limited signal);

(d) as in claim 1, the modulation signal is produced by a data string x of a broad frequency band; (Fig. 2; x is the information data);

(e) as in claim 1, the modulation signal's value is changed over among three or more values in response to a value of the data x (Figs. 2 and 3; column 5, lines 46-51);

(f) as in claim 1, the modulation signal is within a range which intersymbol interference does not occur between adjacent data (Fig. 3; column 2, lines 14-23); and

(g) as in claim 4, the groove or the mark has an inner circumference side wall face and an outer circumference side wall face displaced with data independent of each other so that different data from each other are recorded on the inner circumference side wall face and the outer circumference side wall face (Fig. 2).

However, Hayashi does not teach the following:

(a) as in claim 1, the data string signal has both its DC component and high frequency component suppressed.

Moses teaches the following:

(a) a modulating signal 20 (Fig. 2);

(b) the modulation signal 20 being produced from a data string 16 which has both its dc component and high frequency component suppressed by a filter means 200 (Fig. 2; signal 16 is filtered by a frequency selective filter means 200 and therefore a dc component and high frequency components are removed; column 4, lines 21-28).

When a data string is used to produce a modulation signal, the data string must be filtered so that no other unwanted signals are involved in the modulation process. Similarly, when Hayashi uses an information string to generate a multi-value signal for modulating a laser light beam, it would have been obvious to one of ordinary skill in the art to remove unnecessary signal components such as DC and high frequency

signals with a band selective filter similar to Moses's, because the band selective filter passes a desired band of signals but rejects its low/DC and high frequency components.

5. Claims 5 and 7 have limitations similar to those treated in the above rejection, and are met by the references as discussed above. Claims 5 and 7 however also recite the following limitations which are also taught by Hayashi:

(a) as in claim 5, detection means 17 for detecting the displacement of the one of the groove, groove wall, mark and mark wall with respect to the track center and outputting a detection result (Fig. 2);

(b) as in claim 5, decoding means 18 for processing the detection result to play back the data of three or more multi-values (Fig. 2); and

(c) as in claim 7, a tracking control means for selectively irradiating the laser beam upon one of wall faces of the groove or mark (Fig. 2; column 11, lines 5-12; tracing a center between tracks can be considered as a tracking control).

6. Method claim 10 is drawn to the method of using the corresponding apparatus claimed in claim 1. Therefore method claim 10 corresponds to apparatus claim 1 and is rejected for the same reasons of obviousness as used above.

7. Claim 12 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 12 however also recites the following limitation which is also taught by Hayashi:

(a) as in claim 12, optical means 15 for displacing the laser beam in a direction transverse to the track in response to the modulation signal (Fig. 2).

8. Method claim 15 is drawn to the method of using the corresponding apparatus claimed in claim 1. Therefore method claim 15 corresponds to apparatus claim 1 and is rejected for the same reasons of obviousness as used above. Furthermore, Claim 15 also recites the following step which is taught by Hayashi:

(a) as in claim 15, displacing the laser beam in a direction transverse to the track in response to the modulation signal (Fig. 2).

***Allowable Subject Matter***

9. Claims 2, 3, 6, 8, 9, 11, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 16-26 are allowed over prior art.

11. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

As in claim 2, the prior art of record fails to teach or fairly suggest the following features:

(a) the modulation signal is produced by frequency converting the band-limited signal with a predetermined carrier signal, and the frequency of the carrier signal is set to a frequency equal to or higher than one half a frequency band to which the data string signal is band-limited.

As in claim 3, the prior art of record fails to teach or fairly suggest the following features:

(a) the modulation signal is a signal obtained by quadrature amplitude modulation of the data string signal or a signal obtained by QAM modulation of the data.

As in claim 6, the prior art of record fails to teach or fairly suggest the following features:



(a) the decoding means includes integration means for integrating the detection result and outputting an integration result, frequency characteristic correction means for correcting a frequency characteristic of the integration result, and demodulation means for quadrature amplitude demodulating or QAM demodulating an output signal of the frequency characteristic correction means.

As in claim 8, the prior art of record fails to teach or fairly suggest the following features:

(a) the detection result by the detection means is a tangential push-pull signal.

As in claim 9, the prior art of record fails to teach or fairly suggest the following features:

(a) the detection means detects a variation of a polarization plane of the returning light and outputs the detection result.

As in claim 13, the prior art of record fails to teach or fairly suggest the following features:

(a) frequency conversion means for frequency converting an output signal of the band limiting means with a predetermined carrier signal; and

(b) the carrier signal having a frequency set to a frequency equal to or more than one half the frequency band.

As in claim 14, the prior art of record fails to teach or

fairly suggest the following features:

(a) the modulation means quadrature amplitude modulates or QAM modulates the data string signal to produce the modulation signal.

As in claims 16, 21 and 26, the prior art of record fails to teach or fairly suggest the following features:

(a) the average distance between adjacent grooves, adjacent groove walls, adjacent marks and adjacent mark wall faces is represented by  $D$ , the numerical aperture of an optical system for playing back the data by  $NA$  and the wavelength of a laser beam by an optical system by  $\lambda$ , the average distance, the numerical aperture and the wavelength are set so as to satisfy the following expression:

$$0.44 < D / (\lambda / NA) < 0.60$$

The features indicated above, in combination with the other elements of the claims, are not anticipated by, nor made obvious over, the prior art of record.

**Conclusion**

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hori (6,198,710) is pertinent because Hori teaches a modulation that suppresses the direct current and low frequency components for recording data.

Fujita et al. (5,469,420) is pertinent because Fujita teaches a multi-value recording apparatus

Hirose et al. (5,181,161) is pertinent because Hirose teaches a multi-value recording apparatus.

13. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C.  
20231 Or faxed to:

(703) 872-9306 (for formal communications intended for  
entry. Or:

(703) 746-6909, (for informal or draft communications,  
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Hand-delivered responses should be brought to Crystal Park  
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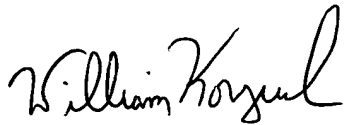
Any inquiry of a general nature or relating to the status  
of this application should be directed to the Group  
receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier  
communications from the examiner should be directed to Kim CHU  
whose telephone number is (703) 305-3032 between 9:30 am to  
6:00 pm, Monday to Friday.

cc 4/2/04

Kim-Kwok CHU  
Examiner AU2653  
April 2, 2004

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